

Remarks

In paragraph 3 of the Examiner's Office Action, the Examiner rejected Claims 14 and 15 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Examiner determined that the term "isocyanate characteristic" is not defined by the claim, the specification does not provide a standard for ascertaining its meaning, and one of ordinary skill in the art would not be reasonably apprised of the limitations of the claim. The term "isocyanate characteristic" was meant to be the equivalent of the "isocyanate index"—a term which is known to one skilled in the art to mean the quotient of the number of isocyanate groups and number of groups which are reactive with isocyanates, multiplied by 100. Applicant has amended the specification and claims to reflect the change of the term "isocyanate characteristic" to "isocyanate index." Thus, Applicant respectfully submits that the Examiner's rejection under 35 U.S.C. § 112 has been overcome. Accordingly, claims 14 and 15 are now deemed patentable.

The Examiner also rejected claims 1, 2, 7 and 8 under 35 U.S.C. § 102(e) as being anticipated by Kanno et al. as evidenced by von Bittera et al. Although Kanno, et al. discloses that an adhesive layer of an adhesive sheet is generally a single layer if it contains elastic microspheres, Kanno et al. does not disclose, or even suggest, a polyurethane gel that includes elastic microspheres as **filler**. Figures 1a and 1G of Kanno, et al. clearly show that the elastic microspheres are **not** used as filler. Moreover, a polyurethane gel is not necessarily commonly used as an adhesive. Kanno, et al. merely discloses that polyurethanes are an example of polymeric materials which are conventionally used as adhesive materials. However, von Bittera teaches that a polyurethane adhesive is a product that is **crosslinked** when used. Neither Kanno, et al. nor von Bittera teach that such a crosslinked polyurethane, with elastic microspheres that

are **not** used as filler, would lead to Applicant's invention. Accordingly, claims 1, 2, 7, and 8 are deemed patentable.

The Examiner also rejected claims 1, 9, 11-13 under 35 U.S.C. § 102(b) as being anticipated by Burgdorfer et al. as evidenced by Steppan et al. and Abe. Burgdorfer et al. discloses a polyurethane gel material in connection with fillers, but does not disclose elastic microspheres as filler. Moreover, Steppan et al. and Abe do not disclose microsphere fillers in **undercured** polyurethane gels. These distinctions are significant because the combination of an undercured polyurethane gel and elastic microspheres as filler leads to a product with previously unanticipated extraordinary mechanical properties. Surprisingly, the shock absorbing power of a product can still be improved when the elastic microspheres are added as filler to the undercured polyurethane gel material, while at the same time, leading to no significant memory module reduction. The following test further demonstrates the advantageous new properties of Applicant's invention:

Example

(Comparative example) Mixing ratio of polyurethane gel with polyol to isocyanate = 100:13,5

(Example according to the invention) Mixing ratio of 20,000 g polyol + 800g elastic microspheres (Dualithe 7000) to isocyanate = 100:10,5

Test Sample	Density (kg/m <sup>3</sup> )	memory modul (kN/m <sup>2</sup> )	Loss Factor
Comparative sample (30 mm)	1051.4	1513.0	0.424
Example of the invention (30mm)	499.6	1455.0	0.512

Applicant will provide an affidavit regarding the above example, pursuant to 37 C.F.R. § 1.132, if the Examiner deems it necessary. Given the above, claims 1, 9, and 11-13 are deemed patentable.

The Examiner also rejected claims 1-11, 16-19 and 21 under 35 U.S.C. § 103(a) as being unpatentable over von Bittera et al. in view of Steppan et al. As explained above, von Bittera teaches that a polyurethane adhesive is a product that is **crosslinked** when used. Furthermore, von Bittera does not teach that such a crosslinked polyurethane would lead to Applicant's invention. Moreover, as noted by the Examiner, von Bittera does not teach the inclusion of elastic microspheres as filler in the polyurethane gel. Although the Examiner states that Steppan et al. teaches the use of elastic microspheres as filler in the polyurethane gel, a study of Steppan et al., in fact, shows that it teaches the use of "known fillers of other types" and "rigid" microspheres, but does not teach the use of elastic microspheres as filler in the polyurethane gel. Accordingly, claims 1-11, 16-19 and 21 are deemed patentable.

The Examiner also rejected claims 1-3, 7, 9-11, 16-19 and 21 under 35 U.S.C. § 103(a) as being unpatentable over von Bittera et al. in view of Abe. Applicant's invention is not rendered obvious by von Bittera for the reasons stated above. Furthermore, Abe does not teach the use of elastic microspheres as filler, which is clear from Figures 1A and 1B of Abe. Moreover, Abe does not disclose or teach the use of polyurethane gel as a synthetic adhesive. Therefore, claims 1-3, 7, 9-11, 16-19 and 21 are deemed patentable.

The Examiner also rejected claims 4-6 under 35 U.S.C. 103(a) as being unpatentable over von Bittera et al. in view of Abe and in further view of Steppan et al. Claims 4-6 are dependent upon claim 1 and are thus deemed patentable for the same reasons above, which render claim 1 patentable in view of von Bittera, et al., Abe and Steppan, et al.

The Examiner also rejected claims 1, 2, 7-11, 16-19 and 21 under 35 U.S.C. 103(a) as being unpatentable over von Bittera, et al. in view of Kanno, et al. Von Bittera, et al. does not render Applicant's invention obvious for the reasons stated above. As the Examiner noted, von Bittera does not teach the inclusion of elastic microspheres in the polyurethane adhesive gel. Furthermore, Kanno, et al. does not disclose, or even suggest, a polyurethane gel that includes elastic microspheres **as filler**. Figures 1a and 1G of Kanno, et al. clearly show that the elastic microspheres are **not** used as filler. Thus, claims 1, 2, 7-11, 16-19 and 21 are deemed patentable.

The Examiner also rejected claim 20 under 35 U.S.C. 103(a) as being unpatentable over von Bittera, et al. in view of Steppan et al. as applied to claim 1 above, and further in view of Konig et al. Although Konig teaches a process for using allophanate polyisocyanates to produce polyurethane foams, it does not teach a process for producing polyurethane gels. Moreover, as explained above, von Bittera, in view of Steppan et al., does not render claim 1 obvious. Therefore, despite Konig, claim 20 is nonetheless deemed patentable.

The Examiner also rejected claim 20 under 35 U.S.C. 103(a) as being unpatentable over von Bittera, et al. in view of Abe as applied to claim 1 above, and further in view of Konig et al. Although Konig teaches a process for using allophanate polyisocyanates to produce polyurethane foams, it does not teach a process for producing polyurethane gels. Moreover, as explained above, von Bittera, in view of Abe, does not render claim 1 obvious. Therefore, despite Konig, claim 20 is nonetheless deemed patentable.

The Examiner also rejected claim 20 under 35 U.S.C. 103(a) as being unpatentable over von Bittera, et al. in view of Kanno, et al. as applied to claim 1 above, and further in view of Konig et al. Although Konig teaches a process for using allophanate polyisocyanates to produce polyurethane foams, it does not teach a process for producing polyurethane gels. Moreover, as

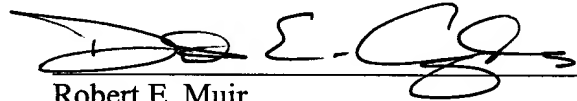
explained above, von Bittera, in view of Kanno, et al., does not render claim 1 obvious.

Therefore, despite Konig, claim 20 is nonetheless deemed patentable.

The Examiner also rejected claims 2-8 under 35 U.S.C. 103(a) as being unpatentable over Burgdorfer, et al. in view of Steppan et al. As the Examiner stated, Burgdorfer does not teach the specifics of the use of elastic microsphere fillers. Furthermore, a study of Steppan et al., in fact, shows that Steppan et al. teaches the use of "known fillers of other types" and "rigid" microspheres, but like Burgdorfer, Steppan et al. does not teach the use of elastic microspheres as filler in the polyurethane gel. Accordingly, claims 2-8 are deemed patentable.

It is submitted that this application is now in condition for allowance and an early notice of allowance is solicited.

Respectfully submitted,



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**Version With Markings to Show Changes Made**

**In the Specification:**

Following is a marked-up version of the second full paragraph on Page 4, Lines 6-12, with all changes shown by conventional comparison (underlining and bracketing):

According to a preferred embodiment, the polyol component for producing the gel consists of a) a mixture of one or more polyols having hydroxyl numbers below 112, and b) one or more polyols having hydroxyl numbers in the range from 112 to 116. The weight ratio of component a) to component b) lies between 90:10 and 10:90. Also, the isocyanate [characteristic] index of the reaction mixture lies in the range 15 to about 60 and the product of isocyanate functionality and functionality of the polyol component is at least 6.15.

**In the Claims:**

The following is a marked up version of claims 14 and 15, with all changes shown by conventional comparison (underlining and bracketing):

14. The material according to claim 1, wherein the polyurethane gel includes a polyol component that includes a mixture of:

a first component that includes one or more polyols having hydroxyl numbers below 112 and second component that includes one or more polyols having hydroxyl numbers in the range from 112 to 600, wherein a weight ratio of the first component to the second component is in a range from 90:10 to 10:90, an isocyanate [characteristic] index of a reaction mixture of the first component and the second component lies in a range from 15 to 60 and a product of isocyanate functionality and functionality of the polyol component is at least 6.

15. The material according to claim 1, wherein the polyol component for producing the gel includes one or more polyols having a molecular weight in a range between 1,000 and

12,000 and an OH number in a range between 20 and 112 and a product of isocyanate functionality and functionality of the one or more polyols is at least 5 and an isocyanate [characteristic] index is in a range between 15 and 60.